

# Energy Solutions Can Lead to More Prosperity

By MARK GINSBERG

For almost three decades, the U.S. Department of Energy has been exploring advanced technologies and producing the research and development that has led to many of the exciting products that help reduce energy waste and create the efficiency needed for prolonged economic growth. From more efficient solar cells and low energy windows to high efficiency motors and wind turbines, the department has been a proud contributor to the energy solution. In fact, the National Academy of Sciences cited just five of these Department of Energy technologies (costing some \$30 million) as responsible for saving American energy consumers \$30 billion.

There are wonderful opportunities in India to apply these technologies. For example, **WIND** is already producing electricity in many parts of India and there is substantial wind potential throughout the country. Over the past 20 years, the cost of wind power in the United States has dropped from 38 cents a kilowatt hour to roughly four cents a kilowatt hour on prime wind sites. Advances in wind turbine design and lighter, stronger materials allow them to operate at lower wind speeds, to harness more wind energy and at greater heights, dramatically expanding the available resources. Last fall, the Texas Land Commission leased a swath of the Gulf of Mexico



**M**ark Ginsberg has been one of the U.S. government's "ambassadors" for energy efficiency and renewable energy for four years, since he was appointed senior executive member of a Department of Energy board dedicated to promoting these policies. These ideas are of abiding interest to India and the United States, as they assure reliable and abundant energy to provide prosperity and economic growth while protecting the environment. "I see zero energy buildings, even zero energy communities, and a new generation of energy efficient product manufacturers," Ginsberg said during interactions in Mumbai, Ahmedabad, Calcutta, Bhubaneswar and New Delhi in early September.

He met with energy companies and consultants, engineering students and teachers, energy managers and auditors, architects and builders. Earlier in his career, Ginsberg oversaw government programs to make buildings, equipment and appliances more energy efficient and to support local government low-energy programs through building codes and consumption standards for household and business appliances. He helped U.S. agencies reduce energy consumption by \$1 billion in 500,000 government buildings and was one of the first to make the connection between energy efficiency and prosperity.



Courtesy Spire Solar Chicago

for gigantic wind turbines that could eventually power 40,000 homes. They are looking at using deserted oil rigs as turbine platforms. The United States' goal is to get 20 percent of its electricity from wind power.

Although **SOLAR** energy may still be more expensive on a large scale, there are some high-value possibilities, for example, 24-hour buildings like hospitals or call centers or banks, where you can't afford to have power outages. In addition, solar is very cost effective for villages that don't have access to power lines. How important it is for countries like India to be able to provide solar powered lighting so children can read at night and to have solar powered water pumps and water purification systems.

Solar power use is growing rapidly as the cost of photovoltaic (PV) cells continues to decline. PV installations in the United States rose 30 to

40 percent last year to reach 275 megawatts. Economics is driving demand. The U.S. government and many states offer tax rebates and other incentives for using solar power. When combined with high energy prices, the payback period for investment in solar power can be as little as four years, and consumers are less vulnerable to power outages. Photovoltaic cells can be integrated into roofs, walls and windows. There are about 1,245 square kilometers of useable roof space on single-story buildings in the United States that could support 50 gigawatts of solar electric generating capacity, 5 percent of the total U.S. installed electric generating capacity.

India imports 75 percent of its oil for transportation uses. In the United States, we import more than 50 percent of our oil. President George W. Bush, in his most important speech of the year, the State of the Union address, said in January that the United States "is addicted

*Photovoltaic system at the Art Institute of Chicago*

to oil.” When you recognize you are addicted, you want to find ways to overcome it. So we’re looking at a new generation of small, local bio-refineries that depend on municipal solid waste, tree cuttings, agricultural waste and other non-food growing products called **BIOMASS** that can produce ethanol or bio-diesel as a substitute for gasoline. These local bio-refineries will produce jobs and retain money in the local economy. Our goal is to make this new kind of ethanol practical and competitive within six years.

With the enormous growth that India is facing, there will be a huge number of new buildings and India has a chance to construct them efficiently from the start, which is much more cost-effective than trying to make a building energy efficient after it is built. You can achieve these savings by installing better quality windows, lighting and insulation, which cuts electricity consumption and saves money. In fact, there are Energy Service Companies which are willing to invest their money in energy efficiency improvements with Energy Savings Performance Contracts. They pay for the efficient lighting or new heating and cooling equipment and share the lower energy cost savings. Thus the building owner doesn’t have to invest its own money, but gets a better, more energy efficient building.

New technologies typically are not understood and can be expensive when they are introduced. So we are doing research to help bring the costs down. Another concern is the lack of a trained workforce to service and maintain new equipment. So the colleges, universities and companies need to form that trained workforce to keep these new products operating effectively. That will create more jobs and a whole new industry. India can be a leader in providing not only for itself but for other parts of the world.

Since electricity is so important to India’s future, we must continue to find ways to use it most efficiently and **REDUCE WASTE**. The Lawrence Berkeley National Laboratory in California has an international program with several scientists from India who have conducted a study and discovered that just four products consume 22 percent of all the electricity in India. These products are: refrigerators, window air conditioners, motors and distribution transformers. There are new, cost-effective versions of each of these products already on the market in India, which could reduce India’s total electricity use by 2.5 percent by 2020. That would save Indian consumers \$5.5 billion from 2010 to 2020, as well as reduce power outages. It would also create more economic productivity, because it would make outages less common, giving businesses a reliable source of electricity. Savings from reduced subsidies could be used for other public purposes. This won’t happen overnight. But as people buy new products, they can buy more efficient ones, knowing that the money they save on electricity will help pay for the new units.

These issues are so important that six countries—India, China, the United States, Australia, Japan and South Korea—have formed a new Asia Pacific Partnership on Clean Development and Climate. Our vision is to apply this new generation of renewable and clean energy technologies to reduce pollution, attain energy security, address climate change concerns, reduce poverty and promote economic development. We hope to combine the intellectual genius of these countries to overcome technical and market barriers to greater use of advanced technologies. As we look to the future and work together, I see growing prosperity from increased efficiency and productivity, less energy disruption and less dependence on oil from volatile parts of the world. □